What is claimed is:

1. A MWD resisitivity tool comprising:

a multi-component MWD resistivity tool further comprising a housing made of metallic materials exhibiting non-magnetic or low magnetic permeability and sufficient mechanical strength to support the tool in a down hole environment;

ferromagnetic inserts in the MWD tool housing to perform focus of the transmitted magnetic fields by concentrating magnetic flux lines into the formation and focus magnetic fields induced from a formation.

2. The MWD tool of claim 1 further comprising:

magnetic assemblies made from ferro-magnetic materials per item placed substantially or partially in the tool housing in a plane perpendicular to the tool longitudinal axis for elongating the paths and increasingly electrical impedance for of longitudinal and azimuthal eddy currents flowing in the tool surface.

3. The MWD tool of claim 1 further comprising magnetic inserts made from ferro-magnetic materials, placed in the tool housing substantially or partially in a plane at a deviated angle not including the tool longitudinal axis for elongating the path of circumferential eddy currents flowing in the tool body.

4. The MWD tool of claim 1 further comprising ferro-magnetic materials in the MWD tool housing to concentrate and route to and from formation magnetic flux into the tool and

across tool thereby guiding magnetic flux through the tool to sensors or receiver coils in such way to increase tool sensitivity to the received magnetic flux.

5. The MWD tool of claim 1 further comprising ferromagnetic fibers oriented substantially or partially in a plane perpendicular to the tool longitudinal axis.

6. The MWD tool of claim 1 further comprising ferromagnetic fibers oriented and placed substantially or partially in a plane at a deviated angle not including the tool longitudinal axis.

7. A MWD tool comprising a symmetric, split construction for ferro-magnetic materials to route measured magnetic fields and corresponding flux density around MWD internal components.

8. The MWD tool of claim 6 further comprising ferromagnetic material placed at the tool surface for controlling surface eddy currents induced exclusively by the transmitter magnetic fields or secondary fields induced in the formation.

9. The MWD tool of claim 6 wherein surface eddy currents control is implemented in external and internal tool surfaces.

10. The MWD tool of claim 6, further comprising a non-conductive coating external to the tool and in drill string sections above and below the tool for the suppression of eddy currents.

11. The MWD tool of claim 6, further comprising ferromagnetic materials in a cylindrical form placed in the area next to, inside or outside sensors or receiver coils, or built in a single block form including the sensors and receiver coils with magnetic fibers uniformly oriented along circular direction perpendicular to the tool longitudinal axis.

12. The MWD tool of claim 10 with magnetic fibers oriented along a near circular direction in a plane not coinciding with the tool longitudinal axis.

13. The MWD tool of claim 1 further comprising ferromagnetic inserts in the MWD tool housing to focus transmitted magnetic fields by concentrating more effectively magnetic flux lines into the formation; and
ferromagnetic inserts in the MWD tool for focusing and amplification of magnetic fields from formation.

14. The MWD tool of claim 1 further comprising magnetic assemblies made from ferro-magnetic materials per item placed substantially or partially in the tool housing in a plane perpendicular to the tool longitudinal axis for elongating the paths of longitudinal eddy currents flowing in the tool surface;

magnetic inserts made from ferromagnetic materials, placed in the tool housing substantially or partially in a plane at a deviated angle not including the tool longitudinal axis for elongating the path of circumferential eddy currents flowing in the tool body; and ferromagnetic materials in the MWD tool housing to concentrate and route formation magnetic flux into the tool and across tool thereby guiding magnetic flux through the tool to sensors or receiver coils in such way to increase tool sensitivity to the received magnetic flux.

15. The MWD tool of claim 1 further comprising:

ferromagnetic fibers placed substantially or partially in a plane at a deviated angle not including the tool longitudinal axis;

a symmetric, split construction for ferromagnetic materials to route measured magnetic fields around MWD internal components;

ferromagnetic material placed at the tool surface for controlling surface eddy currents induced exclusively by the transmitter magnetic fields or secondary fields induced in the formation, wherein surface eddy currents control is implemented in external and internal tool surfaces; and

a non-conductive coating external to the tool and in drill string sections above and below the tool for the suppression of eddy currents.

16. The MWD tool of claim 1, further comprising ferromagnetic materials in a cylindrical form placed in the area next to, inside or outside sensors or receiver coils, or built in a single block form including the sensors and receiver coils with magnetic fibers uniformly

oriented along circular direction perpendicular to the tool longitudinal axis, further comprising magnetic fibers oriented along a near circular direction in a plane not coinciding with the tool longitudinal axis.

17. The MWD tool of claim 1 further comprising:
wherein the transverse magnetic path further comprises any magnetic path combination in a transverse plane perpendicular to the tool longitudinal axis.

18. The MWD tool of claim 1 further comprising:
at least one of a tuned, broadband and re-tunable receiver coil.

19. The MWD tool of claim 1 further comprising: at least one of a tuned, broadband or re-tunable source.

20. The MWD tool of claim 1 further comprising:
a multi-layer flexible circuit board containing at least one of a coil, a magnetic layer and a shield.

21. A method of determining a parameter of interest of an earth formation having a plurality of layers, the method comprising:
conveying a multi-component resistivity logging tool into a borehole in a selected layer in said formation; and

using transmitter receiver combinations to provide measurement selective sensitivity to the desired reservoir formation properties.

22. The method of claim 21, further comprising:

making multi-component measurements for at least one of geo-steering and drilling assistance and well placement decisions.

23. The method of claim 21, further comprising:

measurement of a multi-component array combined with measurement of at least one of a gyro, accelerometer, magnetometer and inclinometer.

24. The method of claim 21, further comprising:

performing dual compensated measurement of a multi-component array to improve at lest one of signal to noise ratio and measurement stability and signal content with reservoir, geological and geophysical information.

25. The method of claim 21, further comprising:

measuring multiple frequency in at least one of sequentially and simultaneously ; and

analyzing multiple frequency survey data for focusing interpretative data in target formation parameters.

26. The method of claim 21 further comprising:

performing multi-component transmitter receiver array measurements at different orthogonal and non-orthogonal orientations comprising at least one of xy, xz, yz, 20°-40°, and 40°-90°.

27. The method of claim 21 further comprising:

performing multi-component measurements combining measurement comprising at least one of symmetric/symmetric, asymmetric/symmetric, and asymmetric/asymmetric.

28. The method of claim 21, further comprising:

using measurements for geosteering.

29. The method of claim 21, further comprising:

measuring time domain response; and

converting time domain into frequency domain and selecting a frequency spectrum of interest for analysis.

30. A method of determining a parameter of interest of an earth formation having a plurality of layers, the method comprising:

conveying a logging tool into a borehole in a selected layer in said formation, said borehole having a first axial direction at an angle to said layers;

exciting a first transmitter having a second axial direction inclined to said first axial direction for producing a magnetic field in the earth formation and receiving a first signal in a first receiver having an axis parallel to said first axial direction;

exciting a second transmitter having a third axial direction inclined to said first and second axial directions for producing a magnetic field in the earth formation and receiving a second signal in the first receiver;

determining from first and second signals said parameter of interest;

wherein a first of said plurality of layers in said formation above said selected layer has a different resistivity than a second of said plurality of layers in said formation below said selected layer, and wherein said parameter of interest includes a direction of the more resistive of said first and second layers relative to the selected layer.

31. The method of claim 30 further comprising exciting the first transmitter and the second transmitter at a first frequency and a second frequency, the method further comprising determining a distance and location from the borehole to at least one of (i) the first layers, and, (ii) the second layer or formation resistivity survey target, identify resistivity anomaly.

32. The method of claim 31 wherein said logging tool is conveyed on a bottom hole assembly used for drilling of the borehole, the method further comprising controlling the drilling of the borehole based on at least one of determined distance and direction.

33. The MWD tool of claim 1, further comprising:

a first aperture shaped to focus a magnetic field for a first coil associated with the first aperture.

34. The MWD tool of claim 33 further comprising:

a switch to adjust the geometry and associated effective electromagnetic characteristics of the aperture.

35. The MWD tool of claim 33 or 34 further comprising a second aperture for a second coil associated with the first aperture which combines with the first aperture to produce a combined electromagnetic characteristic for the combined coil electromagnetic fields.

36. The method of claim 21 or 23, further comprising:

binning measurement data.

37. The method of claim 36 further comprising:

averaging depth intervals and azimuthal sectors for the binned measurement data.

38. The method of claim 36 or 37 further comprising:

processing the binned measurement data; and

estimating or inverting formation drilling target parameters from the processed binned measurement data from a given transmitter receiver array.

39. The method of claim 38, further comprising:

making a well placement plan along with a known reservoir drilling target model;

defining expect measurement response for a transmitter receiver array.

40. The method of claim 39, further comprising:

making a drilling decision to continue or modify drilling plans based on differences between inverted formation drilling target parameters obtained from processed measured binned data and the expected measurements response based on an initial drilling plan and reservoir parameter model.

41. The method of claim 21, wherein

a transmitter source is periodic with respect to both time domain and frequency domain.

42. The method of claim 21, wherein

the raw data assigned to a depth interval and azimuth sector falls in different points of the repeat cycle thus, further comprising,

averaging a time series having unequal time intervals between sampled points.

43. The method of claim 21, where the tool rotation is not synchronized with a transmitter repeat cycle.

44. The method of claim 21, wherein the tool rotation is synchronized with the transmitter repeat cycle.

45. The method of claim 21, further comprising:

holding the tool stationary while the raw data times are collected.